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evident, but the explanation of the intensified zones and of the second inhibitory zone, sometimes seen, is not very apparent. It is probable, however, that the dissolved oxides or salts of the metals are in too great concentration in the clear zone, and that the trace present in the intensified zone may stimulate growth. This does not explain the second inhibited zone. The length of time it is necessary to leave the metals in contact with the agar, in order to develop the inhibitory action was tried with brass, copper, cadmium and zinc. Plates of *Staphylococcus p. a.* were made in the usual way and the metals put on and removed at various intervals. With cadmium there was a clear space where the metal had lain and for 1 mm. around, where the metal had been left on for a minute. Where the metal had been left on for 3 or 4 minutes or more the clear space usually extended over 3 mm. around where the metal had lain. With zinc the results are similar as regards length of time, but the edges of the clear zone are not well defined and there is an intensified zone that is not apparent with cadmium. With brass there was no effect produced by leaving the metal on for 36 minutes; after this there was more and more marked inhibition up to 50 minutes, but no clear space except where the metal was on for a longer time than this. With copper no visible effect was produced in less than 36 minutes. After this time there was more and more marked inhibition, but only where the metal had been allowed to lie on for 50 minutes was there a clear space. The whole paper is very suggestive and is commended to experiment station workers and all who have to deal with problems relating to fungicides and germicides. Probably the increased development and prolonged activity of chlorophyll in foliage sprayed with Bordeaux mixture is also attributable to the stimulating effect of the minute traces of copper that must pass into the leaves. The paper contains 10 pages and 11 figures, and has been distributed as a reprint.—ERWIN F. SMITH.

ZOOLOGY.

Antivenine.—Prof. Fraser has laid before the Royal Society of Edinburg some important results of his admirable experiments on snake poisons and their antidote. His method is to ascertain the minimum lethal dose for an animal, to begin experimenting upon a similar animal with a smaller dose. After a short interval he increases this dose until, in time, he can inject fifty times the minimum lethal dose into the animal's blood without producing any bad effects. This animal is immunized, and its blood serum, injected into another animal of the same size and weight, will prevent the action of snake poison when injected. This immunized blood serum is called, by its discoverer, *antivenine.*

In experimenting with rabbits it was found that the blood serum of one which had received thirty times the minimum lethal dose was as effective in its antitoxic properties as that of one which had received fifty times the minimum lethal dose.

The antivenine obtained from a horse was found to be twice as powerful as that from the rabbit. In immunizing a horse the same method is adopted as is used for the rabbit, viz.: to begin by injecting a small dose; then to give regularly increasing doses, every few days, until fifteen times the minimum lethal dose is administered. The blood serum from from a horse thus immunized is found to be so powerful an antivenine that a hundredth, and even the thousandth part of a cubic centimeter per kilogramme of animal was sufficient to prevent death from the minimum lethal dose of the venom. For a horse to arrive at this stage of immunism requires four months and a half.

The antivenine can be kept for use in two forms, liquid and dry, of which the latter is preferable as less liable to decomposition.

In the course of his experiments, Prof. Fraser discovered that dietary has an effect upon venom poisoning. If a herbivorous animal be put upon a flesh diet, the effect of venom upon it is lessened.

Through another set of experiments Prof. Fraser concludes that the deadly effects of serpents' venom is due to its action on the blood. Venom is almost inert when introduced into the stomach. Nevertheless, an animal may be immunized by the administration of poison into its stomach. This fact is due to the absorption of the poison by the blood. This may account for the immunity from snake-bites said to be enjoyed by some of the snake-charmers of India, who eat the poison-glands of the snakes.

Snakes themselves have been noticed to be impervious to the effects of the poison. This may probably be due to the absorption of venom shed from poison-glands through the mucous surfaces of the mouth, or by the blood-vessels and lymphatics passing to and from the glands. In some cases it may be secured by serpents devouring other members of their tribe.

It is now within the range of certainty that, at no distant date, Dr. Fraser will be able to have sufficient quantities of antivenine from the immunized horse to be of practical value to those who are exposed to the bites of venomous snakes. It remains now to discover the chemical constituents of the antivenine, so that it may be manufactured in such quantities as to reduce its cost. (Knowledge, Aug., 1895).

Dall on the Lamellibranchiata.—In his contributions to the Tertiary Fauna of Florida, Part III, Dr. Dall adopts a new classification of the Pelecypoda for which he claims the merit that the groups are comparably defined. The general features of the system proposed by the author in 1889 have been revised, and form the basis of the one now offered. As a matter of convenience, the division Pleoconcha made by Neumayer to contain certain synthetic types is retained for a temporary resting place until more is known of these undifferentiated ancient forms.

For the present, then, the class is divided into the following groups, of which the third represents the most perfected (although not always the most specialized) modern type of Pelecypoda.

Order Prionodesmacea containing 34 families grouped under 10 superfamilies. Order Anomalodesmacea, 15 families under 3 superfamilies. Order Teleodesmacea, 46 families under 18 superfamilies. The Palæoconcha, 11 families.

Under each family is an enumeration of the chief generic groups believed to be referable to it.

The genus Solemya Lamark, in this new classification, is placed with the Prionodesmacea. (Trans. Wagner Free Institute, III, Pt. 3, 1875).

On the Species of Uma and Xantusia.—In THE NATURALIST for 1894, p. 434, I gave descriptions of the two species of Uma known to me at that time. An examination of the material in the U. S. National Museum has revealed two additional species, which I describe below. The *U. rufopunctata* is based on nine specimens, of which seven are from Arizona, where they were obtained by Dr. E. A. Mearns, U. S. A. The *U. inornata* is represented by a single specimen (No. 16,500), from the Colorado Desert, San Diego Co., Cal., from Mr. C. R. Orcutt.

I. Black crescents on the throat, and a black spot on each side of the belly.

Labial scales strongly keeled, six keeled suborbital scales; eight loreal rows; hind-foot shorter, one-third head and body; femoral pores 40–50; dorsal spots black; *U. scoparia* Cope.

II. Black spots on side of belly, but no crescents on throat.

Labial scales strongly keeled, three or four keeled suborbitals; five or six loreal rows; ten or eleven supraocular rows; hind-foot shorter, one-third head and body; femoral pores 24–28; dorsal spots rufous; *U. rufopunctata* Cope.

Labial scales weakly keeled; nine loreal rows; fourteen supraorbital rows; hind-foot longer, two-fifths head and body; femoral pores nineteen; *U. notata* Baird.

III. No black spots on belly or crescents on throat.

Labial scales strongly keeled; five or six loreal rows; ten or eleven supraocular rows; hind-foot shorter, one-third head and body; femoral pores 19; *U. inornata* Cope.

In the young the disciform areas are imperfectly outlined.

All the species are from the Sonoran region.

In the last number of THE NATURALIST, p. 859, I described a new Xantusia from California, but neglected to give it a name. I propose that it be called *X. picta*.—E. D. COPE.

Comparisons of Marriages and Births in the Different European Countries.—The following facts were compiled by M. Chervin and presented by him to the Anthropological Society at its recent conference at Broca. The first fact to be noted is that in respect to the number of marriages France falls a little below the number recorded in the principal countries of Europe, as the following table testifies.

Of 1000 people of both sexes, over 15 years of age, the per cent. that marry is as follows: Hungary, 91.6; Germany, 53.0: England and Wales, 52.6; Denmark, 52.0; Austria, 51.3; Italy, 50.1; Finland, 49.2; Holland, 49.0; France, 45.8; Belginm, 41.9; Greece, 41.6; Scotland, 40.9; Switzerland, 40.8; Ireland, 23.0.

But the number of marriages is only one of the factors in the problem of the increase of population. The most important thing is the fecundity of these unions. Statistics in regard to births are given as follows: (1) Legitimate living children born of 1000 married women from 15 to 50 years of age—Germany, 270; Scotland, 269; Belgium, 265; Italy, 251; England and Wales, 250; Austria, 250; Sweden, 240; Ireland, 240; Switzerland, 236; France, 163. (2) Illegitimate living children born of 1000 unmarried women from 15 to 50 years of age—Germany, 265; Scotland, 199; Belgium, 198; Italy, 246; England and Wales, 121; Austria, 444; Sweden, 444; Ireland, 41; Switzerland, 102; France, 167.

These lists show that in respect to legitimate births France falls below the other European countries, and even taking into account the illegitimate births, she is far behind Germany, Austria and Italy in point of increase of population. (Revue Scientifique, May, 1895).

Additions to the Mammal Fauna of British Columbia.—MICROTUS PRINCIPALIS sp. nov. Type, ad. ♂ ; col. of S. N. Rhoads, No. 2346. Col. by A. C. Brooks on the Mt. Baker Range (alt. 6000 ft.), Westminster Dist., B. Columbia, Aug. 16, 1895.

Description: Size, largest of the western *Microtinæ*, color and proportions as in *M. pennsylvanicus*. Skull broad, rectangular. Incisors strongly produced anteriorly; molars relatively very weak. Incisive foramina short and compressed, not reaching anterior molars by 3 millimeters.

Above, including tail and feet, grayish-brown, not darker along median line. Below, sooty gray, darkest where bases of hairs are exposed, distal two-thirds of hairs dull white; sides of lower neck and lips white. Pelage soft and silky. Fourth loop of $\underline{\text{m. 1}}$ triangular, meeting fifth loop medially, the latter nearly twice as large as former and scroll shaped. The same remarks apply to the last two sections of $\underline{\text{m. 2}}$. Trefoil posterior section of $\underline{\text{m. 3}}$ one and two-thirds length of anterior section of same tooth, this section being composed of an anterior loop and two opposing triangles. The formation of $\overline{\text{m. 1}}$ is as follows: an anterior subcircular loop opening broadly into two angular wings whose lateral points form the anterior pair of a series of five angles on the inner and four on the outer sides of the tooth, including the opposite angles of the posterior loop and the lateral points of two outer and three inner closed triangles.

Measurements: Total length 246 millimeters; tail vertebræ (tip missing), 78+ ; hind foot, 29.5. Skull: basilar length, 36 ; length of nasals, 11.6 ; interorbital constriction, 5.2 ; zygomatic expansion, 23.2 ; crown length of molar series, 8 ; length of mandible, 25 ; greatest breadth of mandible 12.5.

This large Vole need be compared with only one described species, *Microtus macropus* (Merriam) from the mountains of Idaho. The most decided differences which can be noted from Dr. Merriam's description and figure are in the molar dentition as particularized above and which can best be understood by a comparison with the diagnosis and plate II in North American Fauna No. 5. Besides the type, Mr. Brooks sent me a two-thirds grown specimen of this Vole which is very similar in color to type, with softer and shorter pelage. Its tail is unicolor, dark and very thinly haired.

PHENACOMYS ORAMONTIS sp. nov. Type, ad. ♂; col. of S. N. Rhoads, No. 2354. Col. by A. C. Brooks on the Mt. Baker Range (alt. 6000 ft.), Westminster Dist., B. Columbia, Aug. 6, 1895.

Description: Above uniform blackish-brown, feet grayish, blackish at instep and wrist, nearly white on digits. Upper tail blackish, lower tail gray, tip white. Lower parts soiled white, showing the plumbeous bases of pelage. Ears smaller, but nearly as prominent, as in an *Evotomys* of same size.

Measurements: Total length, 154 mm.; tail vertebræ, 38; hind foot, 20.5. Skull: basilar length, 23; length of nasals, 7.8; interorbital constriction, 3.4; zygomatic expansion 15.7; length of interparietal, 4.1; width of same, 6.9; length of mandible, 16.3; greatest breadth of same, 9.2.

This short-tailed Tree Vole is very different from *P. longicaudus* True, its nearest geographic ally. From *P. intermedius* of south central British Columbia it is distinguished by the exceedingly small size of the outer last triangle of $\underline{\text{m. 3}}$ and that it is distinctly cut off from the posterior loop. In $\overline{\text{m. 1}}$ there is a broad crescentic loop as in Dr. Merriam's figure of *P. latimanus* but differing therefrom in its being completely cut off from the first outer triangle (loop) with which, in *latimanus*, it forms a trefoil. From all the four forms first described by Dr. Merriam it differs in having the second loop of $\overline{\text{m. 3}}$ almost completely divided into two sections by the exaggeration of the outer angle of this loop (see fig. of *latimanus*, pl. IV, N. A. F., No. 2) and the acuteness of the next entrant angle on the same side, forming a small outer median triangle whose inner angle is so nearly closed by the impinging enamel walls that the gap can only be seen by a glass. In this feature it resembles *P. orophilus* of Idaho, from which it differs in no essential dental characters. In color, however, the two are distinct and *oramontis* has an interparietal like *celatus*, which Dr. Merriam states to be very different from that of *orophilus*. There may be other cranial differences, but these are all that can be distinguished from the rather meagre description of *orophilus*. Only one specimen was sent me by Mr. Brooks.

TAMIAS QUADRIVITTATUS FELIX subsp. nov. Type, ad. ♀; col. of S. N. Rhoads, No. 2355. Col. by A. C. Brooks on the Mt. Baker Range (alt. 7000 ft.), Westminster Dist., B. Columbia, Aug. 13, 1895.

Description: Colors and color pattern as in *quadrivittatus* but much darker than that type. Darker also than *T. q. affinis* or *T. q. luteiventris*, which latter it most nearly resembles. From *luteiventris* of the same season it is distinguished by: (1) greater breadth and depth of rusty orange suffusion of sides, cheeks and lower tail; (2) rusty brown of upper head, neck, shoulders and fore-back; (3) greater breadth and blackness of dark dorsal stripes and corresponding diminution and rustiness of white stripes; (4) absence of hoary appearance of whole upper surface seen in *luteiventris*.

Measurements: Total length, 245 mm.; tail vertebræ, 105; hind foot, 32.5. Skull; basilar length, 26.5; length of nasals, 10.5; interorbital constriction, 7.4; zygomatic expansion, 20; length of mandible, 11; greatest width of mandible, 20.

So far as I am able to examine specimens, this is the darkest representative of the *T. quadrivittatus* group. It is represented by a male and female, both adults and from the same locality. Their measurements show *felix* to be as large as, if not larger than, any of its conspecific allies.

The above newly described mammals formed part of a small collection recently made and forwarded to me by Mr. Allen C. Brooks. They demonstrate emphatically the wonderful variety which characterizes the Zoology of the mountain regions of the Pacific Slope, even in northern latitudes.—S. N. RHOADS.

Zoological News.—MAMMALIA—At the June meeting of the Linnean Society of N. S. Wales, Mr. Robert Brown read a paper on a new fossil Mammal allied to Hypsiprymnus, but resembling, in some points, the Plagiaulacidae. The remains, described under the names of *Burramys parvus*, are those of a small marsupial not larger than an ordinary mouse. The form is specially interesting in having but three true molars in each jaw, and a very large grooved premolar with serrate edge, very similar to that found in the Eocene genus Neoplagiaulax. Its affinities are dealt with at some length, and an endeavor made to trace its relationship phylogenetically. (Proceeds. Linn. Soc. N. S. W., 1895).

ENTOMOLOGY.[1]

Entomology at Springfield.—The most important entomological meeting at Springfield in connection with the A. A. A. S. was that of the Association of Economic Entomologists, August 27 and 28. The

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[1] Edited by Clarence M. Weed, New Hampshire College, Durham, N. H.